Small Business Innovation Research/Small Business Tech Transfer

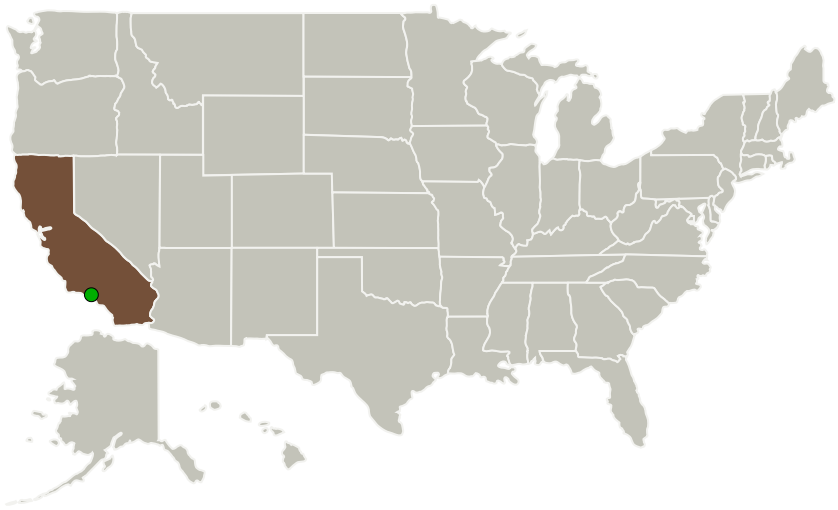
Low Power Digital Correlator System for PATH Mission, Phase I

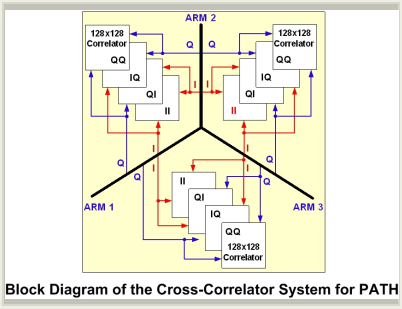
Completed Technology Project (2014 - 2014)

Project Introduction

The NASA's PATH mission employs a synthetic aperture radiometer that produces 768 IF (10MHz - 500MHz) signals. Digitizing the signals results in 1.536Tb/s (1GS/s, 2-bit) data stream. Within the NASA's SBIR contracts NNX12CE50P and NNX13CP01C, Pacific Microchip Corp. has developed a low power 64x64 cross-correlator ASIC offering the reduction of the amount of data to manageable levels. This ASIC includes an array of 128 digitizers operated at 1GS/s and 2-bit precision. This ASIC is the key component in the proposed cross-correlator system for the PATH mission. The innovation offers to greatly reduce the power consumption, weight and the system's complexity. Phase I will demonstrate the feasibility of implementation of the system based on the developed ASIC. We will design the cross-correlator system's schematic, its behavioral model and will run the simulations proving the requirements of the PATH mission can be met. The PCB will also be designed to prove the feasibility of the system's physical implementation and meeting electrical and thermal requirements. Phase II will result in the complete system's assembly, its electrical and thermal characterization and validation on the PATH's radiometer which is being developed at JPL.

Primary U.S. Work Locations and Key Partners





Block Diagram of the Cross-Correlator System for PATH

Low Power Digital Correlator System for PATH Mission Project Image

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Organizations Performing Work	Role	Type	Location
Pacific Microchip Corporation	Lead Organization	Industry	Culver City, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Project Transitions

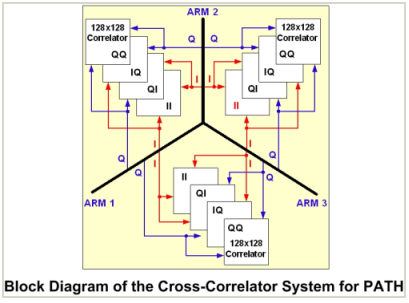
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140588)*

Images



Block Diagram of the Cross-Correlator System for PATH

Project Image

Low Power Digital Correlator System for PATH Mission Project Image *(https://techport.nasa.gov/image/133474)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Pacific Microchip Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Denis Zelenin

Co-Investigator:

Denis Zelenin

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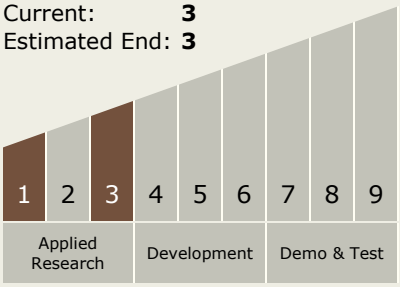
Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System